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NIGERIA

ANNUAL REPORT

ON THE

AGRICULTURAL DEPARTMENT

FOR THE YEAR

1930.

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Annual Report on the Agricultural Department, Nigeria, 1930.

Staff Changes.

The sanctioned staff was increased in 1930-31 by three Superintendents of Agriculture. Mr. P. H. Lamb, Deputy Director of Agriculture, retired in July after eighteen years' service in the department; his place was filled by the promotion of Mr. A. J. Findlay who was previously Assistant Director of Agriculture, Southern Provinces. Mr. C. J. Lewin, Senior Botanist, was transferred on promotion to be Chief Agriculturist in Northern Rhodesia. Capt. J. O'N. Hewitt, Deputy Assistant Director of Agriculture, Northern Provinces, resigned his appointment, as also did two junior officers. Dr. Bryce was appointed Deputy Assistant Director of Agriculture, Southern Provinces.

Organisation.

2. A scheme was introduced in 1927, by which the Assistant Directors in charge of the work in the Northern and Southern Provinces assume almost independent responsibility, except as regards the broader matters of principle. This arrangement has proved increasingly satisfactory. The increasing experience also of many of the other officers, and the greater continuity that has been possible recently, have helped to effect a steady improvement in the efficiency of the departmental team as a whole. The " team-spirit " in the department has been a source of great satisfaction to me for several years; but it has never been quite so complete and strong as at the present moment. While it involves some giving as well as taking on everyone's part, this spirit not only greatly facilitates the work of the department as a whole, but also increases the pleasure and pride which each officer can take in his own work. I owe gratitude to many officers in the department for the share they have had in fostering this spirit.

The Recruiting Arrangements.

3. It is now possible to assess with certainty the effect of the post graduate scholarship scheme introduced a few years ago for recruits for all colonial agricultural departments. Under this scheme all ordinary recruits receive two years post-graduate training, of which the second year is always spent at the Imperial College of Tropical Agriculture in Trinidad. The scheme is unquestionably justifying itself.

Locusts.

4. For some months a great deal of the time of many members of the department was occupied in the destruction of locusts or in advising and helping Residents to organise their campaign for this purpose. During the dry weather 1929-30 swarms of flying locusts were observed in all the provinces of the middle part of the country; the coastal belt and the extreme north alone remained free. So far as could be ascertained, however, the swarms were not very numerous. It was anticipated that breeding would occur in the rainy season and preparatory measures were taken, so far as was possible with the scanty knowledge then available about the habits of our particular species of locust (*locusta migratoria migratorioides*) in our local conditions. But there was then no reason to anticipate that breeding on such a scale as it occurred in April, May and June. In many provinces reports were received of the occurrence of many large bands of hoppers although few swarms of flying locusts had previously been reported in the particular provinces or in neighbouring ones. The date of the occurrence of hoppers there coincided with the occurrence of hoppers in the provinces where adult swarms had been seen. Either a very large and rapid invasion of flying swarms occurred at the very beginning of the rains, or else many provinces had been

infested by numerous and considerable swarms of locusts for some time and failed to give any information to that effect. So far as can be judged the latter seems the more probable explanation.

Southern Provinces.

5. In the Southern Provinces the occurrence of hoppers was limited to Oyo and Abeokuta and the work of destruction was, in the main, carried out directly by officers of the Agricultural Department; the administrative officers assisted in the obtaining of labour. Every agricultural officer available from the other Southern Provinces stations, as well as from Moor Plantation, was placed on special duty in this campaign; and, threw themselves heart and soul into the work and achieved excellent results. The methods used were driving into trenches, trapping by means of corrugated iron leads to pits and spraying with a sodium arsenite solution. The railway fitted up a power driven sprayer on a truck in front of a locomotive and useful work was also done with this, for the hoppers tend to move along the open space provided by the railway. Vast quantities of hoppers were destroyed, but it is feared that many escaped destruction, grew to the adult stage, and flew away to the North. Those " escapes " were chiefly due to lack of information about hopper bands in thinly populated parts of the country. Considerable difficulty was met in obtaining enough help from the apathetic local population for efficient trenching operations; for such operations necessitate a considerable supply of unskilled labour.

Northern Provinces.

6. In the vast areas of the Northern Provinces, where every province was infested, it was obvious that the numbers of agricultural officers were altogether too small for them to be able to cope with the situation alone. The proposal was therefore put forward, and readily approved by His Honour the Lieutenant-Governor, that one agricultural officer should be posted to each province to demonstrate methods and to organise the campaign; but that for the actual executive work, political officers should be placed on special duty, together with officers seconded for the purpose from other departments. The Royal West African Frontier Force, the Education, Public Works, Survey and Forestry Departments were all good enough to spare officers for this purpose. At the height of the campaign as may as 100 officers were thus on special locust duty. In most provinces the campaign was very effective and comparatively few bands of hoppers grew to maturity. In some of the more sparsely inhabited and out-of-the-way provinces, however, it would seem that many bands escaped destruction and the resultant locusts flew north and north-east. By July this process was complete and since this generation all flew north before breeding, the whole country was by then free from locusts, except the more northerly parts of the provinces along the northern boundary. There were there not only most of the surviving swarms from Nigeria, but also numerous " invaders ". The chief concentration was in Eastern Bornu in the vicinity of Lake Chad; but some breeding also occurred all along our northern boundary, and still more also, undoubtedly, across it in the neighbouring French Territory.

Second Generation of Hoppers.

7. The hoppers resulting from eggs laid by these locusts began to occur in the latter part of July. From August to October a very vigorous campaign was conducted against the hoppers in Eastern Bornu, and also in Zaria; there was a less intensive infestation and campaign in Western Bornu, Kano and Sokoto. It is believed that in Eastern Bornu and Zaria very few hopper bands escaped to become adult. In Western Bornu and Sokoto, there is reason to fear that the destruction was somewhat less complete, largely owing to lack of adequate information of the location of the bands. On the whole, however, it may be said that by the end of that stage, there were comparatively few swarms left in Nigeria. The campaign in Eastern Bornu was organised by Mr. Lean, Entomologist,

ably and energetically assisted by the local political officers, and some members of the Royal West African Frontier Force and cadets who were deputed for the purpose. At the maximum the total European staff numbered nearly a score. A field campaign in that area at that time of the year involved considerable hardship, and there was always some of the staff on the sick list. In part of the area poisoned bait (bran or sawdust treated with sodium arsenite) was used, elsewhere hoppers were driven into trenches. In all 100 tons of bait were used and it is estimated that 2,200 acres of hoppers were killed with poisoned bait, almost 1,100 acres by spraying with poison, and 4,000 acres by driving into trenches. (In driving the hoppers are, it is estimated, only about one-third as dense on the ground as the poisoned bands). Poisoned bait was also used in Northern Katsina where a considerable and effective campaign was carried out by the local administrative officers, with some assistance from the Agricultural Department. Some few swarms began to fly southward into the middle part of Nigeria, breeding on the way, late in September. It is not quite certain whether these were belated swarms of the second generation or early swarms of the third, but the former seems the more probable.

Dry weather invasion.

8. At the end of the rains vast swarms of the third generation were seen coming in from French Territory in Eastern Bornu and other places. Elsewhere, although swarms were not actually seen crossing the frontier, the places and dates at which they were first seen in Nigeria leaves little doubt that swarms flew in across practically all parts of the land boundary, and throughout the dry weather, in the whole of the middle portion of Nigeria, in Niger Province, Ilorin, Oyo, Abeokuta, Kabba, Ogoja, Onitsha, and the northern portions of Ondo, Benin, and the Cameroons, there have been very numerous swarms continually flying about, but not breeding. The most northerly provinces have been almost free from locusts during the dry weather, and the coastal belt has only been occasionally visited. In spite of an apparently much higher mortality during this dry weather than that of 1929-30, there can be little doubt that there are more locusts —perhaps ten or twenty times as many—in the country now (March, 1931) as there were a year ago, and consequently a much more serious infestation of hoppers must be expected in the coming rainy season. Preparations are being made for very extensive campaign of hopper destruction during the rains of 1931.

Preparations for next campaign.

9. It is proposed to use the poisoned bait method chiefly. Last year's experience in Bornu and Zaria indicated that this is much the most effective method. The use of poison on such a large scale cannot be entirely devoid of risk to human life and stock. However analysis shows that the amount of arsenic in poisoned hoppers is so small that it is hardly possible for a human being to eat a fatal quantity of them, and experience in Bornu and Zaria has shown that, if the population are properly warned, the spreading of the bait involves little risk to stock. It is certain that there were no human fatalities in either area; there is said to have been a dozen or so of cattle killed in Northern Katsina, but this is not certainly established, and it does seem certain the estimate is an " outside one ". It is reasonable to expect that bands of hoppers in the 1931 season will be so numerous and widespread that unless poison were used, efforts in destruction would be practically useless.

Damage to Crops.

10. The most damage has been done by flying swarms. These feed mainly on plants of the grass family, such as ordinary grasses, maize, guineacorn and other millets. In addition some other *monocotyledons*—pineapple plants, banana plants and fan palms—have been seriously attacked. There has been rare and

slight damage to oil palms. The hoppers damaged crops mainly at the beginning of the season, so that the crop either had opportunity to recover, or, when the field was ruined, it could still be replanted. Fortunately, apart from the locusts, the season was a favourable one. Thus while many farmers must, individually, have suffered greatly, food is not scarce and prices in different parts of the country vary from normal to, at the outside, one-and-half times the normal. There has been no general widespread shortage of food.

Result of efforts.

11. From the damage that was done, and the general, though not great, rise in price of food stuffs that resulted, it can be seen how very serious the situation would have been, if the destruction of hoppers had been neglected. It is also clear that a serious situation may well occur in 1931, unless the poison-bait campaign is vigorously conducted.

Permanent Breeding Grounds.

12. It is suspected that the shores of Lake Chad form a permanent breeding ground from which infestations originate. It also now appears that since the last great locust infestation in Nigeria, some thirty-five years ago, there have been several times when a few flying swarms have been seen in Bornu. But it is not known of which species these were, for it is found that in addition to the locust which is now in the migratory stage in Nigeria there is also, on the shores of Chad, the South African locust *Nomadacris septemfasciata;* and moreover occasional swarms of the desert locust and the tree locust have been seen in Nigeria. It is hoped that by investigating the situation when *migratorioides* has reverted to the solitary phase, and by keeping a watch on Lake Chad in future, it may prove possible to prevent infestations of locusts from that area. It is hoped that neighbouring colonies will adopt similar measures in regard to any permanent breeding grounds of the locust that may be found within their territories.

American Cotton in the Northern Provinces.

13. The yield per acre of cotton in the Northern Provinces this year was, so far as can be judged, much below normal owing to ill-distributed rains. The area planted seems to have been only a little below normal. After last year's comparatively low price some restriction of area was to be expected. The resowing of food crops, which was necessitated by the ravages of locusts, led to some delay, and possibly some further slight reduction, in the sowings of cotton. As a result of all these factors it is judged that, if the price had been normal, some 25,000 bales would have been bought. But the price offered was only seven-tenths of a penny per pound of seed cotton at markets on the railways during most of the buying season, and it was even less than this at times. The total quantity bought up to the time of writing, which is nearly the end of the season, indicates that the season's purchases will be only between 14,000 and 15,000 bales, the least amount that has been exported since the American cotton became fully established in the Northern Provinces.

EXPORTS OF AMERICAN COTTON FROM THE NORTHERN PROVINCES.

TABLE NO. 1.

Year.	Bales.	Price.	Year.	Bales.	Price.
1915–16	121	1¾d.	1923–24	15,683	4d. falling to 3d.
1916–17	433	1¾d.	1924–25	27,996	3d.
1917–18	855	2½d.	1925–26	37,356	2½d.
1918–19	2,248	2¾d.	1926–27	16,659	1⅝d. to 1⅞d.
1919–20	3,568	3¾d.	1927–28	16,316	2⅜d. falling to 2½d.
1920–21	5,405	4½d.	1928–29	24,686	2¼d. falling to 2⅛d.
1921–22	9,883	2d.	1929–30	34,389	16/10d. falling to 12/10d.
1922–23	11,224	2½d.	1930–31	14,500*	Fluctuating between 5/10d. & 8/10d.

* Estimate.

The amounts purchased in the different parts of the cotton belt of the Northern Provinces, during each of the last six years, were as follows :—

COTTON PURCHASED FOR EXPORT.

(IN BALES OF 400 LB. NETT WEIGHT OF LINT.)

TABLE NO. 2.

	1925–26.	1926–27.	1927–28.	1928–29.	1929–30.	1930–31.*
Zaria :—Bauchi Line	5,456	2,504	1,578	2,786	3,030	1,200
Remainder...	5,618	2,740	1,971	2,094	2,691	550
Katsina Emirate South	15,336	9,011	7,261	9,809	15,253	8,850
„ „ North	1,783	143	915	1,880	2,106	300
Sokoto Province	6,177	1,488	3,607	7,069	10,227	3,000
Kano Province	1,642	237	518	357	425	...
Niger Province	1,344	536	466	471	747	500

* Approximate only.

Jassid Attack.

14. This year, for the first time, there was a somewhat serious infestation of Jassids. This was most noticeable at the Empire Cotton Growing Corporation's farm and at Maigana where there were considerable areas of the strain " D " which it had long been recognised would probably be susceptible to the attacks of jassids if this insect should ever become as serious a pest here as it is in many dry countries. The belief that this is the first year, for at least five or six years, that this pest has been numerous, does not rest merely on the fact that it has been watched for before, but not seen. Its sudden occurrence in large numbers this year is proven by the fact that several exotic non-immune strains of cotton have been grown at Samaru for several years, have not been attacked at all, and have appeared perfectly normal. This year they were most heavily attacked and the contrast between them and more immune strains was very striking.

15. The ordinary " Commercial Allen ", of which seed is distributed on a large scale each year, is, as regards vegetative characters, a heterogenous mixture, and some plants suffered seriously from jassid attack. But since the susceptible plants constituted only a proportion of the whole, the reduction of yield per acre caused by jassids appeared not to be very great. Naturally the situation in regard to the pure, non-immune, strain " D " was much more serious, since, wherever it was attacked, every plant suffered. Even so the damage was not universal. At Daudawa, where there was a large area under this strain, only a part of the farm suffered badly; on a smaller scale the same was the case at Samaru, where one block only was heavily attacked; at Maigana, where there were some forty acres of " D " strain, damage was more general, but not very heavy. At Dan Ja, seed of the strain had been given to native farmers for the first time; but most fortunately there was no jassid damage at all there and the " D " strain did quite well. In an experiment at Samaru " D " strain gave as good a yield as the " commercial " allen, in spite of the jassid attack.

New Strains.

16. Fortunately the Botanist at Samaru had some more recent selections under trial which had been expected to be, and this year proved to be, immune to jassids. These are superior to the " D " strain, in jassid resistance, and moreover, according to our experiments and to the brokers' reports and spinning trials, they are slightly superior to " D " in yield per acre and quality of lint. We should therefore have expected, in due course, when the new strains were fully tested and multiplied, to replace the " D "

strain by them. Thus looking sufficiently ahead, the failure of " D " owing to jassids is not important. But for the moment it is extremely disappointing, especially in connection with the Empire Cotton Growing Corporation's farm at Daudawa. That farm was established for the purpose, almost solely, of multiplying our superior strains; and in so doing, it will perform a valuable and indispensable function. During the first year or two of the farm's working, we had no superior strain to be multiplied; now that the farm has been able to fulfil its purpose, the first new superior strain proves to be, in some degree, a failure. For it is clear that it would be unwise further to multiply and distribute " D " to native farmers. The " D " strain seed will not be distributed in the coming season and the testing and multiplication of the new strains will be carried on as quickly as possible.

Groundnut Selections.

17. During the last two or three years, after the cotton breeding work had been reduced to a routine, the plant breeders in the Northern Provinces have been able to devote some attention to other crops. The first crop studied was groundnuts. There is little question of quality in groundnuts and it is only in yield per acre that there is a possibility of improvement. In many trials of many varieties from other countries, none had been found which would yield so well as the local groundnut. The general inferiority, in local conditions, of the yield of imported nuts has again been demonstrated by trials of a further series of imported types. The problem is complicated by the fact that erect types are needed for heavy soil, because they are easier to harvest; but on light soil, where harvesting involves little difficulty, spreading types generally yield better. The plant breeders have isolated single plant selections of both erect and spreading kinds of which the progeny, in trials on a very small scale though with ample replicates, have yielded some twenty-five *per cent.* better than the unselected local nuts of the same type. If these results are confirmed by the larger scale tests which it is now intended to make, then it is only a question of time and organisation of seed supply to effect a considerable increase in the local crop of nuts.

Guinea-corn Breeding.

18. The plant breeders have also started selection and breeding in local Zaria guinea-corn. The results are similar, and the selections are at a similar stage at present, to those in groundnuts. Both general experience and actual experiments, however, show that any particular variety of guinea-corn is of value only in a very restricted area of country. For instance the best variety of guinea-corn at Zaria, may prove almost a complete failure at Kano and *vice versa*. Guinea-corn selection work and the testing of selections is therefore being started at all our Northern Provinces' farms.

Mixed Farming.

19. The various independent farmers who have taken up mixed farming, mentioned in last year's reports, have, with one or two exceptions, had a very successful year; and in consequence there are several more " converts " who propose to start this year. Also several Emirs and District Heads propose to take up this system this year. Until now we had rather discouraged than encouraged such officials from taking up mixed farming on their private farms, since it was felt that they might well meet with a degree of success which would be fallacious, in that it would not subsequently also be attained by ordinary farmers. This consideration is however no longer of any importance, and the propaganda value of the farms of such leaders of the community cannot be neglected. In Kano Province five Emirs, and in Kano Emirate all the District Heads, will probably take to mixed farming this year.

Experimental Work.

20. Experimental work on various problems arising out of mixed farming has been continued. The remarkable effect of even one ton of farmyard manure on guinea-corn has again been confirmed. It has also been shown that with this crop it pays to give so small a dressing every year rather than a dressing of two or three tons at longer intervals. It has also been found that although a heavy dressing of farmyard manure will cause an increase in the yield of groundnuts, that increase is relatively so small that it is much more profitable to use the manure on other crops. Incomplete experiments in using cows that are in milk for ploughing tend to indicate that while there is some loss of milk, it is not so great as necessarily to rule this economical practice out altogether. Experiments are in progress to study whether, in the interest of the manure, it is necessary to have any roof over a cattle pen, as it is probable that the native farmer would prefer an unroofed pen. Fairly good ensilage has been made from ordinary grass during the rains for use in the dry weather, and haymaking at the same season will now also be attempted. The chemists at Samaru have tried to ascertain the reason for the quite remarkable increase of yield produced by a very small quantity of farmyard manure in the Northern Provinces. So far as their work has gone, it seems that the same amounts of phosphate and nitrogen when applied to the soil in artificial manures do not produce a result comparable to that from the farmyard manure; and it seems incredible that the effect could be very directly due to the organic matter which is supplied, since the total quantity is so small.

Stock Farm.

21. The collection of the foundation stock for the stock farm at Shika, near Zaria, is now finished and we have satisfactory herds of about 100 adults of both the " white Fulani " and the " Shuwa " breeds, and a small herd of a breed from Adar in Sokoto Province. A good deal has been learnt about the local cattle and their feeding. In conjunction with the chemist at Samaru, the nutritive value of the pastures have been investigated throughout the year; the value of the native salts that are regularly fed to cattle is being investigated, and also the necessity or otherwise for giving bonemeal; and a series of feeding experiments have been started. Everything learnt so far tends to confirm the basic assumption which was made some years ago, that little improvement in the cattle is possible unless concurrently their feed is improved, which means that any considerable improvement will only be possible in cattle that are kept by farmers. Except in June and July the composition of the local grass is generally so extremely poor that, however plentiful it may be, only a very hardy, slowly maturing, poorly milking animal can thrive on it. It has been found that, in the dry weather, cattle that receive no food in addition to grazing and native " salts " may lose weight even on lightly stocked lowland pasture. The various investigations and feeding experiments promise to yield information of much scientific value and possibly of considerable economic value. About eighty acres of crops were grown for cattle food and more land has been broken up ready for next year.

22. Both at Shika and Samaru the general progress of the work with stock under " mixed farm " conditions is satisfactory and the prospects of considerable eventual improvement in the standard still seem bright. The only serious difficulty that has been encountered on our farms is the mange-like disease " Kirichi ". A very satisfactory dipping tank has been built at Shika, but it has not yet been in use long enough to judge of its effect on this disease. A dip is also in course of construction at Samaru. There is no doubt that this disease is a serious trouble to the native cattle owner in some districts though not in all. It is possible that the native, by giving greater individual attention to his animal, may

be more successful than we have been in keeping the disease under control by local treatment. It is also possible, though it does not seem highly probable, that keeping cattle in roofed pens may encourage this disease.

Rice Mill.

23. In 1929-30 just over 400 tons of paddy were bought at .42d. per pound. Owing to unavoidable delays in the erection of the parboiling plant, the milling and selling of the 1929-30 purchases had to be postponed until the dry weather of 1929-30. Unfortunately it has been an extremely bad time for selling rice in Zaria and Kano. The low prices offered for groundnuts and cotton result in few people having money for luxuries, and the firms have large stocks of imported rice, which they bought cheaply in the present condition of the world rice market, and which they are finding great difficulty in selling. Some forty tons of our rice have been sold at Zaria and Kano at 2d. per pound—a price which covers all overhead expenses, depreciation, etc. But the sales were so slow that the price has had to be reduced to 1½d. per pound, which only covers out-of-pocket expenses. Under these circumstances only a very low price for paddy has been offered in 1930-31, and as there is a shortage of other food in some parts of the Sokoto Province, practically no paddy has been bought this year. It is considered to be wiser virtually to miss a season than to buy at an uneconomic price.

Ginger.

24. Sixteen tons of ginger have been bought this season (1930-31) as compared to 11½ tons last year and six tons in 1928-29. Our experience in selling the previous crop has emphasised the importance of grading for plumpness as well as whiteness, and as a result of the previous demonstrations and propaganda work, the ginger this year is considered to be of a better grade than in previous years. Demonstrations were considered to be unnecessary this year. Over a ton has been bought in grades 1 or 2 for which prices ranging from 3d. to 6d. per pound were paid according to quality; 2½d. per pound was paid for grade 3. The price offered by local firms was very poor as compared to the price of ginger in England. This had been the case in 1928-29, and in that year we had therefore to buy the crop on behalf of the Zaria Native Administration and sell it through the Imperial Institute. In spite of paying much better prices than the firms would have paid, the Native Administration then made a clear nett profit of some £70 on the six tons. The same arrangement has therefore been adopted again this year. It is probably better that we should handle the crop ourselves during these early years, since proper grading, and the payment of graded prices, is peculiarly important with this crop. There have been requests for advice and demonstrations from native farmers in areas far removed from our activities, so that it is hoped that production will continue to increase. Experiments have been made in the effect of cultural methods on quality. A little superior " seed " was also imported, although the quality appears to depend on soil, manure and moisture rather than on the " seed ". If a high quality can be attained—and there seems no reason why it should not—very high prices can be offered, and the crop would then be a very profitable one to the grower who has suitable land.

Irrigation Farming at Kworre in Sokoto Province.

25. As indicated in last year's report, much progress had been made recently in solving many of the initial problems of improved irrigation farming, and it had been hoped that this year really satisfactory results would be achieved. Until shortly before the rice was ready to harvest this hope seemed justified. Then most unfortunately a rise of quite unprecedented height and rapidity occurred in the river; the bank which protects the whole

area which is under " controlled irrigation " burst; all efforts to repair it were unavailing; and our whole crop was ruined. Fortunately the native farms in the area are on slightly higher land than ours and they did not suffer badly. A good deal has been learnt about which crops can, and which cannot, be successfully grown on the irrigated land in the dry season; and it has been shown that as many as three valuable crops can be obtained from the same land in one year. One of the main objects of the farm was to serve as a demonstration to encourage native farmers in the use of the irrigated land. For this purpose it has been successful. Most of the land irrigated by the canal is now in use, and the general standard of the farming increases each year. The area presents a great improvement now as compared to its condition even a year ago. The people took advantage of the canal so very slowly and unskilfully in the early years that it may justly be believed that they might never have made good use of it, had we not established a farm there.

Benue Province.

26. The measures mentioned in last year's report which have been taken to eradicate black benniseed (*sesamum rediatum* and *ceratotheca sesamoides*) from the benniseed of the Benue Province, by exchanging pure seed, provided by the trading firms, for impure has been very successful. These impurities have been eliminated from the major part of the producing area, and the work is now being extended to the more distant areas. There seems reason to hope that the export of this crop may increase. One of the handicaps to production is the local method of harvest which is very laborious. Much less laborious methods have been used on our own farm; they have proved to be quite satisfactory and there seems no reason why they should not be adopted by the Munshis. Again, although the Munshis are hardworking farmers, their food crops are frequently very poor, so that there is often some shortage of food, which naturally handicaps any export. In some of their methods, for instance the times of planting yams and guinea-corn, their practice differs sharply from that of the whole of the rest of Nigeria. Experiments on our farm seem to prove conclusively that this is no question of adjustment to local climate or soil, but simply that the Munshi practice is wrong and crops sown at the usual times give much heavier and more certain yields. It is hoped gradually to induce the Munshis to adopt the better practice. Green manuring also seems very successful and profitable in this province and one or two men are already giving it a trial. This practice again should reduce the amount of land and labour that has to be devoted to food crops and leave more available for export crops.

Cotton in Southern Provinces.

27. The quantity of " Improved Ishan " cotton seed sold in 1930 was 115 tons as against 110 tons in the previous season, and there is every reason to believe that this cotton has now almost entirely replaced the native variety in the areas which contribute to the export trade. The crop per acre is at least fully normal, perhaps rather better than that. With any normal price it could have been expected that at least 10,000 bales would be bought as against 6,000 last year and nearly 1,000 the year before. Actually the prices are $\frac{3}{4}$d. per pound of first grade Ishan seed cotton and $\frac{1}{2}$d. per pound of native second grade. The buying season has only just opened and it is difficult to estimate how much of the Ishan cotton will be bought at this price, but it will certainly only be a fraction of the whole crop. It is expected that very little native cotton will be bought.

28. The following table gives the number of bales of " Native " and " Improved Ishan " cotton purchased in recent

years and prices per pound of seed cotton for first grade Improved Ishan and second grade native :—

	Native Cotton.		Improved Ishan.	
	Bales.	Price.	Bales.	Price.
1927–28	4,546	$1\frac{5}{8}$ rising to $2\frac{1}{8}$	68	$2\frac{5}{8}$ rising to $3\frac{1}{4}$
1928–29	6,501	$1\frac{7}{8}$ falling to $1\frac{5}{8}$	939	$2\frac{1}{2}$ falling to $2\frac{1}{4}$
1929–30	3,510	$1\frac{1}{4}$ „ „ $\frac{5}{8}$	6,026	$1\frac{5}{8}$ „ „ $\frac{7}{8}$
1930–31	300*	$\frac{1}{2}$d.	3,000*	$\frac{3}{4}$d.

* Preliminary estimates.

29. On the agricultural side the Improved Ishan cotton has proved an undoubted success. The way in which the native farmers have taken it up shows that their experience is confirming the results of our experiments, *i.e.*, that the Improved Ishan gives a higher and more reliable yield per acre than the native cotton.

Quality of the lint of Improved Ishan.

30. But unfortunately it appears that, now that this cotton is on the market in some quantity, it is not now regarded by most spinners as worth so much more than native cotton or ordinary American, as had been anticipated on the basis of the numerous brokers' reports and the spinning tests. The premium that is being paid this season is not unsatisfactory in the present state of the market; but it is less than had been anticipated, and it is felt that it should be possible to grow a more valuable cotton than that in these provinces. There is no doubt that the quality of the Ishan lint has not deteriorated. The fault which is found with it is not its length, strength or uniformity, but the unquestionably rough texture of the fibre. This roughness has been characteristic of this cotton from the beginning, but it was apparently not regarded by the brokers and spinners, who valued or bought the early samples and consignments, as being so serious a defect as it is now found to be. Fortunately the firms other than the British Cotton Growing Association who buy this cotton do not seem so dissatisfied with it, and the problem may be only one of finding the right market for it.

Future Policy.

31. There is little doubt that the native farmer will continue to grow the Improved Ishan cotton even if it only fetches so small a premium over native cotton as this year's experience would suggest; nor is there any doubt that it will pay him to grow it for this amount, and for its higher and more reliable yield, as well as because the seed cotton is mainly of the first grade instead of second. The reason why the situation in regard to the price is so disappointing is that, although the present export of native cotton is normally only 8,000 or 10,000 bales, there seems no reason whatever why, with a more reliable cotton and a little higher price, a much larger area of cotton should not be grown. It is difficult to set a figure to the possible export from Southern Nigeria, but an eventual 50,000 bales would seem not to be impossible, and 30,000 bales almost certainly attainable. An increased area depends, however, on an increased price per pound of seed cotton. It need hardly be said that the means by which this can be attained are being most seriously reconsidered in the light of recent experience. The plant breeder has other strains of Ishan, of which the lint seems to be less rough than that of the " A " strain, though the plants of those strains are less hardy and disease-resistant than those of the " A " strain. It is possible that by crossing " A " strain with the others, or possibly even with an exotic cotton of a similar type, it may be possible eventually to isolate a hardy superior strain.

Cacao Industry.

32. The year has brought a severe attack of black pod disease in Ibadan and Ilesha districts and in the Cameroons, and experiments in sanitation methods are being started on native farms. In other districts the incidence of the disease has been normal. The gradual development of the farmers' societies, formed round the collective cacao fermenting houses, into co-operative bodies with their own officials and a paid secretary managing their affairs, has continued satisfactorily. There are, of course, ups-and-downs in this as in other matters, but it can fairly be said that the outlook is promising. If only one complete lasting success can be attained, its example will be an encouragement to others. The failures we can only hope will provide a warning of the dangers that may be encountered. We can claim another successful year for the Ife Farmers' Association which again has managed its own co-operative marketing and has sold 160 tons of cacao as compared with 106 tons last season; this at an average premium of £2 13s. per ton over F.A.Q. prices. The membership increased from 100 to 250 during the year and the association now has a bank balance of £100. The Ondo Farmers' Association is also making good progress. It has built and paid for five stores and it is now appointing its own clerks to work under Agricultural Department clerks' supervision, while two sub-associations are conducting their own affairs entirely. They sold 195 tons this year as against 159 last year. The Ilesha Farmers' Association, after unremitting and prolonged efforts by our Agricultural Officers, has at last taken steps to reform itself internally, and shortly after the close of the year appointed a new secretary. A much better spirit appears to inspire the Association and there is now a brighter prospect for its organisation on a sound basis. In the Central and Eastern areas cacao growing progresses slowly and that only in a few favoured spots where conditions are suitable for the crop. It is doubtful if production in these regions will ever reach a figure of any material importance, as most of the soil is unsuitable for cacao.

Cameroons Extension Work.

33. In the Cameroons cacao growing has a great attraction for the people and planting is extending rapidly, especially along motorable roads that are being built and for some distance ahead of the construction. Co-operative fermenting and marketing are making satisfactory progress, and the number of fermenting houses has increased from twenty-eight to thirty-three. There is a falling off in the quantity handled, however, to 150 tons this year against 195 tons last year, partly due to a severe attack of black pod disease, and partly to cacao being taken across the French frontier from districts adjacent to it.

Experimental Work with Cacao.

34. The Mycologist has concluded the experiments mentioned in last year's reports, and has found that by turning fermenting cacao twice at suitable intervals as good a product is obtained as by daily or even more frequent turning—a point which, though it may seem a small one, may prove of considerable economic importance. Reports on samples sent to manufacturers show that cacao which they would regard as consisting of 100 *per cent.* of fully fermented beans cannot be attained in ordinary practice with West African cacao: it can only be prepared by leaving pods on the tree so long that some are bound to be over-ripe and germinated, for it is not possible to harvest all pods at the ideal stage. These reports also show that there is considerable difference between what a manufacturer and what a merchant or broker regards as a fully fermented bean. The periodical examination of some cacao kept in a dark and poorly ventilated store at Moor Plantation for ten months, shows that even in such conditions cacao, which is thoroughly dry when put into the store, does not deteriorate so very rapidly even during the rainy season. It is

evident that the rapid deterioration of West African cacao which is said often to occur during storage in England must generally be due to the cacao never having been thoroughly dried at first, as is now enforced under the Nigerian " Produce Export Regulations."

Green Manuring.

35. The results mentioned in last year's report, establishing the fact that ordinary soil in the Southern Provinces can be permanently and profitably maintained in a high state of fertility, have been still more strongly confirmed this year at Moor Plantation. For as high yields of yams have been obtained this year as were obtained eight years ago on the same land after a long period of " bush-fallow ", and the yields all over the farms have compared well with those of 1922, our previous best year. In the Ilorin Province, the use of this practice among native farmers, though still on a small scale, is steadily extending. But at Benin and Umuahia green manuring has not proved successful. Investigations by the chemists show that the soil of those places—the " Benin Sands " soils—are very peculiar in several respects. It is proposed to experiment in treating them with lime and artificial manures. It is hardly likely that such treatment could be economical; but it would seem that, economical or not, we ought to ascertain the best treatment for that very poor soil, since it is farmed by several million people, and its poverty and peculiarity must have a very important influence on the future of the country.

Palm Oil Presses.

36. Further slight progress has been made in extending the use of presses for palm oil extraction. A few more have been bought by native farmers during the year and those who had previously bought presses continue to use them with satisfaction. The great handicap is the high price of the press; and efforts to reduce this have been continued. A press manufactured by a foreign firm is much better value for money than any that we have tested before; for it is the same price as the English made ones, but is much larger and more solidly built. We are asking those makers if they can turn out a smaller one at a lower price. In addition, the chemist has made, and is now testing, a press constructed largely out of local wood, which may well prove the solution of the problem. By continued research, on rather more scientific lines than those previously followed, he has also been able to improve the details of the press process in a way which greatly reduced the amount of labour needed; and now, at last, this process compares well with the native process in the matter of labour, while still remaining more efficient in the quantity of oil extracted. If we can but get a press costing only some £4 or £5, then, with this latest process, there seems at last a prospect of rapid progress in extension work. The United Africa Company, Limited, have started to sell the machines on an instalment plant to buyers whom we recommend to them.

Native Palm Plots.

37. The small native owned improved groves have been, on the whole, well maintained, in spite of the reduced finances of their owners, consequent on the fall in the price of produce. But the harvesting has been unsatisfactory in several of them. The harvesting is carried out by the owners, who merely give notice of their intention, so that a " clerk " can be present and weigh the produce. In some cases it is suspected that all the fruit has not been harvested, and in others it is known that some was harvested without our knowledge. Thus some of the experiments which have been reported previously are omitted from the table below. It may be mentioned that, for what they were worth, the unreliable figures were as favourable to the cleared plots as those given here.

		Average yield of Bunches per acre.		
		1928.	1929.	1930.
Ikparakwa A ...	4 plots, each ½ acre, in bush ...	2,120	3,058	3,360
	3 do. do. cleared ...	3,150	4,696	4,842
Ikparakwa B ...	3 do. do. in bush ...	2,428	2,535	3,490
	3 do. do. cleared ...	3,030	2,897	3,780
Azumini ...	5 do. do. in bush ...	1,410	2,704	2,330
	4 do. do. cleared ...	1,844	2,531	3,068
Aba A	5 do. 1 do. in bush ...	457	697	605
	4 do. do. cleared ...	1,035	2,148	2,279
Aba B	5 do. do. in bush ...	1,401	1,748	1,475
	4 do. do. cleared ...	2,259	3,007	3,133
Aba C	5 do. do. in bush ...	1,333	1,456	1,334
	4 do. do. cleared ...	1,399	2,653	3,587
Ekadilor, Benin Province	5 do. do. in bush ...	...	...	1,847
	4 do. do. cleared ...	...	...	2,571

It will be seen that while the yields of the bush plots remain about the same as last year, the yield of the " cleared " plots has increased. The increases in yield that occurred generally in 1929 as compared to 1928, might in some cases have been due partly to more thorough harvesting. But the increases in 1930 as compared to 1929 are believed not to be due to that cause at all. The results from the plots near Benin, which were thinned only late in 1929, confirm the earlier ones in Owerri and Calabar. There is a good deal of variation in the yields of the different plots, as is to be expected in view of the fact that the plots are merely parts of ordinary " wild groves ", which are of varying density. The superiority of the cleared plots over the uncleared plots varies from under ten *per cent.* to over 200 *per cent.* probably fifty *per cent.* or so is the kind of figure that would be obtained if the groves were uniform. The young palms planted under the old ones are progressing satisfactorily, except where the old ones are very thick on the ground, and need more thinning than the owners will permit. When it is remembered that even the uncleared plots in these experiments are harvested more thoroughly than is usual, it will be realised what an enormous increase in production would follow if all grows could be cleared and thinned.

Small Native Plantations.

38. The area of native palm plantations continues to increase. Some sixty acres more have been planted during the year; of this, twenty acres is included in five entirely new plots and the remainder are extensions of old plots. The owners of three small plots totalling four acres have been advised to abandon them, because they were not looking after them properly. The total area of plantations is about 170 acres, or 290 if the improved groves be included. The obstacles to more rapid progress in this extension work are the facts that few " owners " have individual independent command of their land and that they lack money, especially now that produce prices are so low. In the circumstances it is perhaps remarkable that extension proceeds at all; and that it does so at present prices is sure evidence of the soundness of the work, from the farmer's point of view. There seems little prospect of any general movement towards more individual control of land being permitted; but even with the overwhelming handicap of the present unsatisfactory position of land tenure, some greater degree of progress would be possible if a system of loans to approved farmers for approved purposes could be established.

Palm Oil Mill Subsidy Scheme.

39. The only mill which applied to come under the subsidy scheme was that at Ibagwa. The capacity of the mill was tested in November and the scheme comes into effect as from the first day of that month. The mill is still experiencing the difficulty that an adequate supply of fruit can only be obtained at an uneconomically high price. If the mill offers a little more than it can afford to pay at current prices of oil and kernels, plenty of fruit comes in. If a price that leaves a margin for profit is offered, the fruit is not brought to the mill.

Produce Inspection.

40. The produce inspection scheme continues to function smoothly and satisfactorily. Few " out-turn reports " have been received this year, because most firms have ceased to send them out to this country, on the ground that the produce is now so uniformly satisfactory. One firm that used to employ a chemist to examine oil and kernels on arrival in England has apparently dispensed with his services for the same reason. There have been practically no complaints of any shipments being found, on arrival, to be below standard. After discussion with the Liverpool merchants' organisations further small modifications were introduced in the definitions of the grades of cocoa in order to bring them still more closely into line with those of the Liverpool market. The present grading seems to be satisfactory so far as can be judged in this country; it is not yet known how well it suits the home market. Although the differences that are being made this year in the prices of the different grades have fallen proportionately with the general price of cacao, and are in fact only about half as much as was paid last year, they are being paid more consistently by all firms and are now becoming better understood by sellers and producers.

Departmental School.

41. Thirteen pupils finished their three-year course this year and passed the final examination; and one—the only unpaid pupil in the class—failed. Those who passed have been appointed to the department on salaries ranging from £54 to £120 *per annum* according to ability, as shown by the marks obtained during the course and in the final examination. It is considered that the best pupils in the class were markedly more promising than the best of the previous class, and equal to those of the class before that, which was the first that took the present course. Good reports continue to be received of those who passed out from the two earlier classes, and they seem to be justifying the trouble that is taken with them by the work they are doing.

O. T. FAULKNER,
Director of Agriculture.

Moor Plantation,
Ibadan, Nigeria,
13th April, 1931.